Lunar Materials Handling System, Phase II

Completed Technology Project (2006 - 2008)

Project Introduction

The Lunar Materials Handling System (LMHS) is a method for transfer of lunar soil into and out of process equipment in support of in situ resource utilization (ISRU). The LMHS conveys solids to the ISRU vessel, provides a gas-tight seal, and minimizes wear related to abrasive particles. Lunar ISRU scenarios require that equipment be operated over many cycles with minimal consumption of expendables and with minimal leakage in order to maintain high overall process leverage. The LMHS increases equipment life and minimizes process losses, thereby increasing overall leverage and reducing uncertainties in ISRU process evaluation. The LMHS is based on a seal arrangement by which lunar regolith can be introduced into and removed from reaction chambers operating under a wide range of batch operating conditions. Most lunar ISRU processes will use regolith as feed. Hydrogen reduction is a prime candidate for nearer-term lunar ISRU implementation. The LMHS was integrated with hydrogen reduction and operated in vacuum during Phase I. The LMHS-hydrogen reduction unit demonstrated feeding, sealing, water recovery for oxygen production, and discharging of residue in realistic operating conditions.

Primary U.S. Work Locations and Key Partners

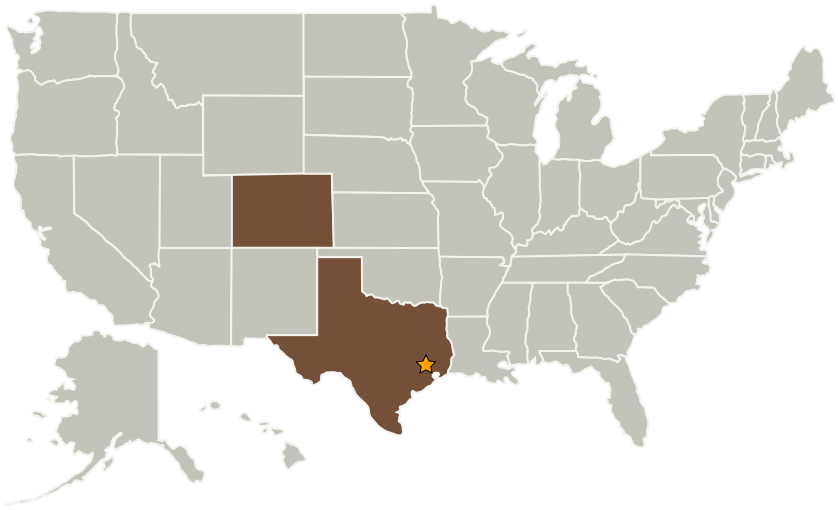

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Pioneer Astronautics	Supporting Organization	Industry Historically Underutilized Business Zones (HUBZones)	Lakewood, Colorado

Primary U.S. Work Locations	
Colorado	Texas

Project Transitions

December 2006: Project Start

December 2008: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.2 Resource Acquisition, Isolation, and Preparation